


SUBSTITUTE FORM PTO-1390		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 09546-011001
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (IF KNOWN)  <b>09/623714</b>
INTERNATIONAL APPLICATION NO. PCT/SE99/00395	INTERNATIONAL FILING DATE March 12, 1999	PRIORITY DATE CLAIMED March 13, 1998	
TITLE OF INVENTION A SUPPORT DEVICE			
APPLICANT(S) FOR DO/EO/US Hakan Appelquist and Jan Setterberg			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). Items 11. to 16. below concern other documents or information included: 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: <input checked="" type="checkbox"/> Int'l Search Report <input checked="" type="checkbox"/> Forms PCT/IPEA/401 and 409 <input checked="" type="checkbox"/> Form PCT/RO/101 <input checked="" type="checkbox"/> WO 99/46052 Cover Sheet <input type="checkbox"/> <input type="checkbox"/>			
		"EXPRESS MAIL" Mailing Label Number <b>EE6471836594US</b> Date of Deposit <b>SEPTEMBER 7, 2000</b> I hereby certify under 37 CFR 1.10 that this correspondence is being deposited with the United States Postal Service as "Express Mail" by the Office To Addressee" with sufficient postage on the date of deposit above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231. <b>Valentin Figueroa</b> <b>VALENTIN FIGUEROA</b>	

533 Rec'd PCT/PTO 07 SEP 2000

U.S. APPLICATION NO. (IF KNOWN) <b>09/623714</b>		INTERNATIONAL APPLICATION NO. PCT/SE99/00395		ATTORNEY'S DOCKET NUMBER 09546-011001	
17. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):					
Search report has been prepared by the EPO or JPO..... \$840				\$0.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) .. \$670				\$0.00	
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).... \$690				\$0.00	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$970				\$970.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2) to (4) ..... \$96				\$0.00	
ENTER APPROPRIATE BASIC FEE AMOUNT				\$970.00	
Surcharge of \$130 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 mos. from the earliest claimed priority date (37 CFR 1.492(e)).				\$0.00	
Claims	Number Filed	Number Extra	Rate		
Total Claims	10 - 20	0	x \$18	\$0.00	
Independent Claims	1 - 3	0	x \$78	\$0.00	
Multiple Dependent Claims(s) (if applicable)			+ \$260	\$0.00	
TOTAL OF ABOVE CALCULATIONS				\$970.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28.)				\$0.00	
SUBTOTAL				\$970.00	
Processing fee of \$130 for furnishing the English Translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 mos. from the earliest claimed priority date (37 CFR 1.492(f))				\$0.00	
TOTAL NATIONAL FEE				\$970.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31).				\$0.00	
TOTAL FEES ENCLOSED				\$970.00	
				Amount to be refunded	
				Charged	
a. <input checked="" type="checkbox"/> A check in the amount of \$970.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. 06-1050 in the amount of \$0.00 to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 06-1050. A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
Richard P. Ferrara FISH & RICHARDSON P.C. 45 Rockefeller Plaza, Suite 2800 New York, NY 10111 (212) 765-5070 phone (212) 258-2291 facsimile			 SIGNATURE Richard P. Ferrara NAME 30,632 REGISTRATION NUMBER		

09/623714

Attorney's Docket No.: 09546-011001 / US 51563 SB/MW

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Appelquist et al.  
Serial No. :  
Filed : 09/07/2000  
Int'l Appln. No.: PCT/US99/00395  
Int'l Filing Date: 12 March 1999  
Title : A SUPPORT DEVICE

Art Unit : Unknown  
Examiner : Unknown

**BOX PCT**

Commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows:

In the Claims:

Page 9, line 1, change "Claims" to --What is claimed is:--.

Claim 1

Page 9, line 15, change "characterized in that" to --wherein--.

Claim 2

Page 9, line 21, change "characterized in that" to --wherein--.

Claim 3

Page 9, line 25, change "any one of claims 1 and 2" to --claim 1--.

Page 9, line 26, change "characterized in that" to --wherein--.

Claim 4

Page 9, line 29, change "any one of claims 1-3" to --claim 1--.

Page 9, line 30, change "characterized in that" to --wherein--.

CERTIFICATE OF MAILING BY EXPRESS MAIL

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I hereby certify under 37 CFR §1.10 that this correspondence is being deposited with the United States Postal Service as Express Mail Post Office to Addressee with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, Washington, D.C. 20231.

Date of Deposit September 7, 2000

Signature Valentin Figueroa

Valentin Figueroa  
Typed or Printed Name of Person Signing Certificate

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Claim 5

Page 9, line 33, change "any one of the preceding claims" to --claim 1--.

Page 9, line 34, change "characterized in that" to --wherein--.

Page 9, line 35, delete "that".

Claim 6

Page 10, line 1, change "characterized in that" to --wherein--.

Claim 7

Page 10, line 5, change "any one of the preceding claims" to --claim 1--.

Page 10, line 6, change "characterized in that" to --wherein--.

Claim 8

Page 10, line 10, change "any one of the preceding claims" to --claim 1--.

Page 10, line 11, change "characterized by" to --further comprising--.

Claim 9

Page 10, line 15, change "any one of the preceding claims" to claim 1--.

Page 10, line 16, change "characterized in that" to --wherein--.

Claim 10

Page 10, line 19, change "characterized in that" to --wherein--.

In the Abstract:

Please add the --Abstract of the Disclosure-- which is attached hereto on a separate page.

REMARKS

The claims have been amended to remove unnecessary and improper multiple dependencies, and to more particularly point out and distinctly claim the invention. No new matter has been added. Claims 1-10 are pending. Of these, only claim 1 is independent.

The Examiner is requested to enter the Abstract of the Disclosure which is attached hereto on a separate sheet. The attached Abstract is based on the Abstract of the corresponding PCT application.

Please apply any other charges or credits to Deposit Account No. 06-1050.

Applicant : Appelquist et al.  
Serial No. :  
Filed :  
Page : 3

Attorney's Docket No.: 09546-011001 / US 51563  
SB/MW

Respectfully submitted,

Date: 09/07/2000

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09546-011001-4766350

--Abstract of the Disclosure

--The invention refers to a support device (6) for a spindle, which carries a centrifuge rotor of a centrifugal separator and which is provided in a frame member by the use of a bearing member to be rotatable about an axis of rotation. The support device (6) includes at least three support members (8) which are arranged to absorb relative movements between the centrifuge rotor and the frame member and each of which is provided between the bearing member and the frame member and has a longitudinal axis (s) extending outwardly with respect to the axis (x) of rotation. Each support member (8) has a helical spring element (10), having a wire extending in an essentially helical path in such a manner that a space is formed between adjacent rounds of the wire. In order to increase the stiffness of the support members (8) and to provide a dampening of the relative movements, each support member (8) includes a rubber material (12) provided at least in the spaces.--

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**A support device**

## 10 THE BACKGROUND OF THE INVENTION AND PRIOR ART

15 The present invention refers to a support device for a spindle, which carries a centrifuge rotor of a centrifugal separator and which is provided in a frame member by means of a bearing member to be rotatable about an axis of rotation, wherein the support device comprises at least three support members, which are arranged to absorb relative movements between the centrifuge rotor and the frame member and which each is provided between the bearing member and the frame member and has a longitudinal axis extending outwardly with respect to the axis of rotation, wherein each support member comprises a helical spring element, having a wire extending in an essentially helical path in such a manner that a space is formed between adjacent rounds of the wire.

25 Conventional spindle support devices for centrifugal separators are mainly of two different kinds, namely support devices, in which helical springs apply a force to oscillation-dampening friction buffers, and support devices, which are constructed by resilient rubber elements producing a dampening effect by inner friction.

30 Such known support devices comprises many components, which make them complicated and expensive. The dampening properties of the friction buffers as well as of the rubber elements are difficult to calculate. On the friction dampening surfaces coatings (coke) are  
35 formed, which change the dampening properties and result in a great risk for jamming. In the friction buffers, wearing particles are formed, which reduce the lifetime of the support device. The

conduct of heat is insufficient in these known support devices, since rubber has a low heat conductivity and the friction surfaces of the friction buffers deteriorate the conduct of heat.

- 5 WO89/10794 discloses an example of such a known support device for a centrifugal separator having a centrifuge rotor which is rotatable in a frame member by means of a bearing member. The support device comprises a number of support members extending radially outwardly from the bearing member and which each  
10 encloses a helical spring element. Consequently, these support members are arranged to permit relative radial movements between the centrifuge rotor and the frame member by being compressed in a respective space of the frame member. The helical spring elements thereby act on a piston movable in the space and abutting  
15 the outer wall of a bearing housing. By means of the spring constant of the helical spring elements, a certain stiffness of the known support device is obtained, which together with the resiliency of, for instance, the rotor spindle, determines the critical number of revolutions of the centrifuge rotor. In centrifugal separators, the  
20 helical springs of this type have to be dimensioned to the frequently very high stresses and fatigue risks to which they are subjected. The dampening of the radial movements is obtained by means of the friction which arises between the piston and its contact surfaces, in particular the outer wall of the bearing housing. The  
25 friction which arises results, in addition to the dampening of the relative movements, also in the generation of heat. Such a heat generation is not desirable and forces the bearing to operate at a relatively high temperature, which reduces the lifetime of the bearing. Another problem is that the arrangement of moving pistons  
30 is rather space requiring. Such a space may be difficult to provide for the support device in a centrifugal separator, in particular outside the so-called necte bearing. In addition, these known support devices have a rather complicated construction, which of course makes the manufacture and the mounting labour demanding  
35 and expensive. In addition, it is difficult to conduct heat away from the bearing member.



## SUMMARY OF THE INVENTION

The object of the present invention is to provide a support device, which from a construction point of view is less complicated than the support devices known up to now and by which the problems mentioned above may be remedied. In particular, it is aimed at a support device offering an optimal stiffness and concurrently an optimal dampening of the relative movements between the centrifuge rotor and the frame member.

This object is obtained by the support device initially defined, which is characterized in that each support member comprises a rubber material provided at least in said space and arranged to increase the stiffness of the support member and at the same time to provide a dampening action of the support member. By such a support member, a desired stiffness may be obtained by dimensioning the helical spring elements in combination with the design and choice of hardness of the rubber material. Since the stiffness determines the critical number of revolutions of the centrifuge rotor, one may by this design of the support device obtain a desired critical number of revolutions. A suitable level of the dampening of the relative movements may be obtained by dimensioning the rubber material between the wire rounds of the helical spring element, i.e. the rubber material is, according to the invention, arranged in such a manner that it has a dampening effect to said relative movements. The incompressible rubber material will thereby be subjected to alternatively compression, expansion and therebetween inhomogeneous loads due to shearing or bending of the helical spring element and the rubber material. By providing a rubber material in this manner in the spaces of the helical spring element, a high stiffness may be obtained by means of smaller helical springs without any risk for overload and/or fatigue. The inner friction, which dampens the oscillating movements, generates heat which is uniformly distributed and conducted by the helical spring element. In comparison with previously known, similar support devices, a support device designed in this manner is space saving.

According to the invention, a desired dampening may be obtained by providing rubber material merely in the space between the wire rounds. According to an embodiment of the invention, the wire is, however, at least partly embedded in the rubber material. In such a manner, the dampening effect of the rubber material may be increased and according to another embodiment, the dampening effect may be further increased by embedding substantially the wire in the rubber material.

According to a further embodiment of the invention, the wire is manufactured in a spring material, wherein the spring material is fixedly connected to the rubber material. In such a manner, the rubber material is forced to follow the movements of the helical spring element, i.e. the dampening of the rubber material is acting continuously. Thereby, the spring material may advantageously be fixedly connected to the rubber material by vulcanisation.

According to a further embodiment of the invention, means are arranged to enable the pretensioning of the helical spring elements in the direction of the respective longitudinal axis. Furthermore, each support member may be provided in a space which is delimited by a stop member, wherein the stop member may be positionable in different positions along the longitudinal axis in order to obtain a variable pretensioning degree of the helical spring element.

## BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is now to be explained by means of different embodiments described as examples and with reference to the drawings attached, in which

Fig 1 discloses schematically a sideview of parts of a centrifugal separator having a support device according to the invention.

Fig 2 discloses a radial section through the support device according to a first embodiment of the invention.

Fig 3 discloses a radial section through a support device according to a second embodiment of the invention.

Figs 4-10 disclose sectional views of different variants of the support members of the support device according to the invention.

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## DETAILED DESCRIPTION OF DIFFERENT EMBODIMENTS

Fig 1 discloses schematically parts of a centrifugal separator having a vertical spindle 1, which is journalled in a lower bearing 2 and an upper bearing 3. The lower bearing 2 is arranged to absorb essentially axial forces acting on the spindle 1 and the upper bearing 3 is arranged to absorb essentially radial forces acting on the spindle 1. The spindle 1 carries at its upper end above the upper bearing 3 a centrifuge rotor 4. The spindle 1 and the centrifuge rotor 4 are rotatable about an axis x of rotation and driven in the example disclosed via a screw gear 5 but may of course also be belt driven.

In the example disclosed, the upper bearing 3 is supported by means of a support device 6 which is fixedly connected to a substantially stationary frame member 7 and which comprises six support members 8 uniformly distributed around the spindle 1, see also Fig 2, which counteract but permit limited relative movements between the spindle 1 and the frame member 7. In particular, the support device 6 is arranged to permit a limited pivoting movement of the spindle 1, and details connected thereto, such as the centrifuge rotor 4, and the upper bearing 3 in relation to the frame member 7. The support device 6 may comprise more or less than six support members 8.

Each of the support members 8 has a longitudinal axis s which extends substantially radially with respect to the axis x of rotation. Each support member 8 is, which appears from Figs 2 and 3, provided in a space 9 of the support device 6, which space has the shape of a substantially circular cylindrical hole extending in essentially the same radial direction as the longitudinal axis s with respect to the axis x rotation. Furthermore, each support member 8

comprises a helical spring element 10 which is formed by a wire extending in an essentially helical path in such a manner that the wire forms a body of rotation having an axis of rotation coinciding with the longitudinal axis s. Furthermore, the wire forms a space 11 between adjacent rounds of the wire, see Figs 4-10. The wire is manufactured in an elastic, resilient material, preferably spring steel.

According to the invention, each support member 8 comprises a rubber material 12 extending in at least said spaces 11. Figs 4-10 disclose more closely how the rubber material 12 may be provided in relation to the helical spring element 10.

In the embodiment disclosed in Fig 6, the rubber material 12 is substantially merely provided in the spaces 11 between adjacent rounds of the wire of the helical spring element 10, i.e. the rubber material forms a tubular body having a wall thickness which is essentially equal to the thickness of the wire. In the embodiments according to Figs 5 and 8, the wire is at least partly embedded in the rubber material 12. In Fig 5, the rubber material 12 extends to an outer delimiting surface of the body of rotation formed by the helical spring element 10 and in Fig 8, the rubber material 12 extends to an inner delimiting surface of the body of rotation formed by the helical spring element 10. In the embodiment disclosed in Figs 4 and 7, the wire of the helical spring element 10 is completely embedded in the rubber material 12.

In the embodiments according to Figs 4 and 7, the rubber material 12 consequently forms an essentially complete, full body, which has an essentially circular cylindrical shape and in which the helical spring element 10 is completely embedded or enclosed. In the embodiments according to Figs 6-8, the rubber material forms a corresponding body having an essential circular cylindrical hole 13 extending through the body in the direction of the longitudinal axis s.

In the embodiments according to Figs 9 and 10, the rubber material 12 also forms a complete, full body having an essentially circular cylindrical shape and being provided with a circular recess 14 in one of the end surfaces, and with a circular recess 14 in each end surface, respectively.

In all embodiments according to Figs 4-10, the resilient material of the wire is fixedly connected to the rubber material 12, preferably through a vulcanisation process.

As appears from Fig 2, each support member 8 is enclosed in one of the spaces 9 mentioned above by means of a stop member in the shape of a screw member 15 which is screwed into a thread of the space 9. The support member 8 abuts, by its radially outer surface the screw member 15 and by its radial inner surface the bearing housing 16 carrying the upper bearing 3. In particular, the radially inner end of the support member 8 is provided in a recess 17 of the bearing housing 16. By means of the screw member 15, it is possible to pretension the helical spring element 10 of the support member 8 to a desired degree of pretensioning in the direction of the longitudinal axis s.

In the embodiment disclosed in Fig 3, the radially inner end of each support member 8 is provided in a piston member 18 which is displaceable in the recess 9 in the direction of the longitudinal axis s. The piston member 18 has a front surface 19 which is arranged to abut a peripheral surface portion 20 of the bearing housing 16. During the relative movements mentioned above, the front surface 19 will slide on the opposite surface portion 20, wherein the friction which arises contributes to a further dampening of the relative movements.

It is to be noted that, as appears from Figs 2 and 3, both the end rounds of the helical spring element 10 are at least partly in heat transferring metallic contact with the bearing housing 16 and the stop member 15 of the support member 8, respectively, which facilitates the conduct of heat from the support member 8.

The present invention is not restricted to the embodiments disclosed but may be varied and modified within the scope of the following claims.

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In the examples disclosed in the figures, the spaces between all the wire rounds of the helical springs are completely filled with rubber material. In order to obtain a desired stiffness and a desired dampening characteristic, it is possible however, within the scope of the present invention, to fill merely the spaces between a part of the wire rounds of the helical springs and/or the spaces may only partly be filled with rubber material.

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It is to be noted that although the helical spring elements 10 are disclosed in the shape of a circular cylindrical helical spring, it is possible within the scope of the invention to design these springs as conical helical springs. They may also have a cross-sectional shape which deviates from a circular shape. Moreover, the cross-sectional dimension of the wire of the spring element 10 disclosed in Figs 4-10 is only schematic.

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In the embodiments disclosed, the longitudinal axis  $s$  of all support members 8 extend in a common radial plane. However, it is also possible to provide the support members 8 in such a manner that the axes  $s$  extend in different planes, for instance, in two parallel radial planes in such a manner that every second support member 8 is associated to one of the planes and every second support member 8 to the other plane. In such a manner, further space may be obtained so that more support members 8 than the support members disclosed in Figs 2 and 3 may be provided, for instance 12 support members 8.

## Claims

1. A support device for a spindle (1), which carries a centrifuge rotor (4) of a centrifugal separator and which is provided in a frame member (7) by means of a bearing member (3) to be rotatable about an axis (x) of rotation, wherein the support device (6) comprises at least three support members (8), which are arranged to absorb relative movements between the centrifuge rotor (4) and the frame member (7) and which each is provided between the bearing member (3) and the frame member (7) and has a longitudinal axis (s) extending outwardly with respect to the axis (x) of rotation, wherein each support member (8) comprises a helical spring element (10), having a wire extending in an essentially helical path in such a manner that a space (11) is formed between adjacent rounds of the wire, characterized in that each support member (8) comprises a rubber material (12) provided at least in said space (11) and arranged to increase the stiffness of the support member (8) and at the same time to provide a dampening action of the support member (8).
2. A support device according to claim 1, characterized in that the rubber material (12) is arranged in such a manner that it produces a dampening effect to said relative movements.
3. A support device according to any one of claims 1 and 2, characterized in that the wire is at least partly embedded in the rubber material (12).
4. A support device according to any one of claims 1-3, characterized in that the wire is substantially embedded in the rubber material (12).
5. A support device according to any one of the preceding claims, characterized in that the wire is manufactured in a spring material and that the spring material is fixedly connected to the rubber material (12).

6. A support device according to claim 5, characterized in that the spring material is fixedly connected to the rubber material (12) by a vulcanisation.

5 7. A support device according to any one of the preceding claims, characterized in that the longitudinal axis (s) of the support members (8) extends substantially radially with respect to the axis (x) of rotation.

10 8. A support device according to any one of the preceding claims, characterized by means (15) which are arranged to enable a pretensioning of the helical spring elements (10) in the direction of the respective longitudinal axis (s).

15 9. A support device according to any one of the preceding claims, characterized in that each support member (8) is provided in a space (9) which is delimited by a stop member (15).

20 10. A support device according to claim 9, characterized in that the stop member (15) is positionable in different positions along the longitudinal axis (s).



Fig 1

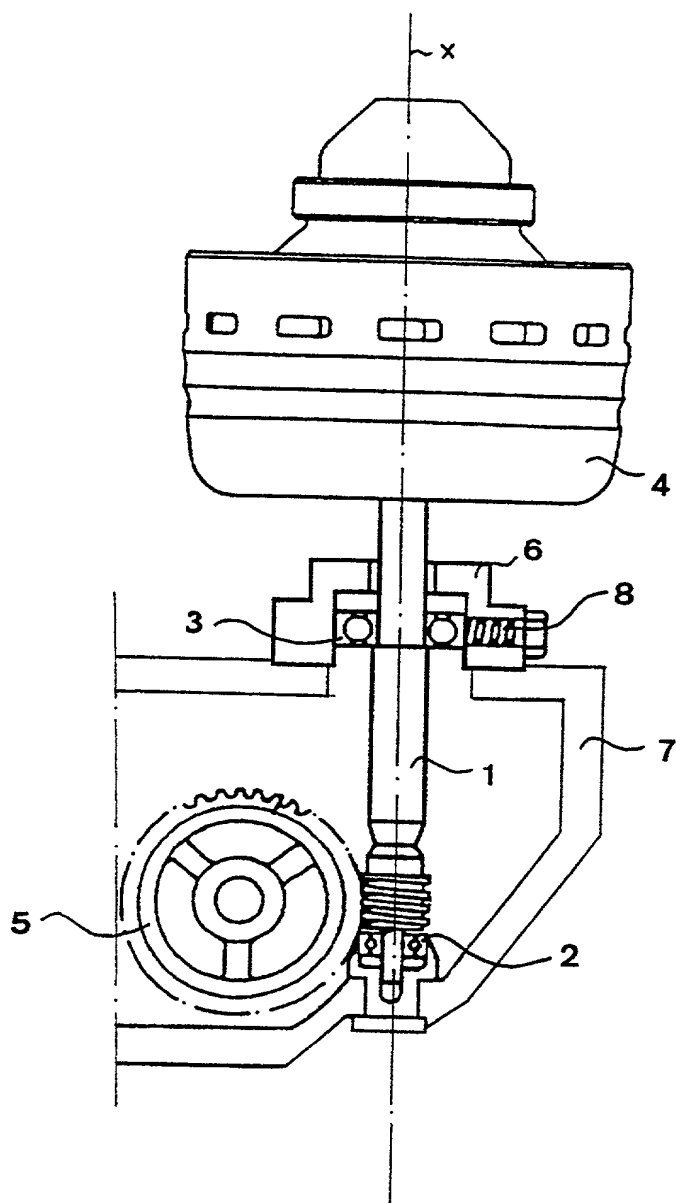


Fig 2

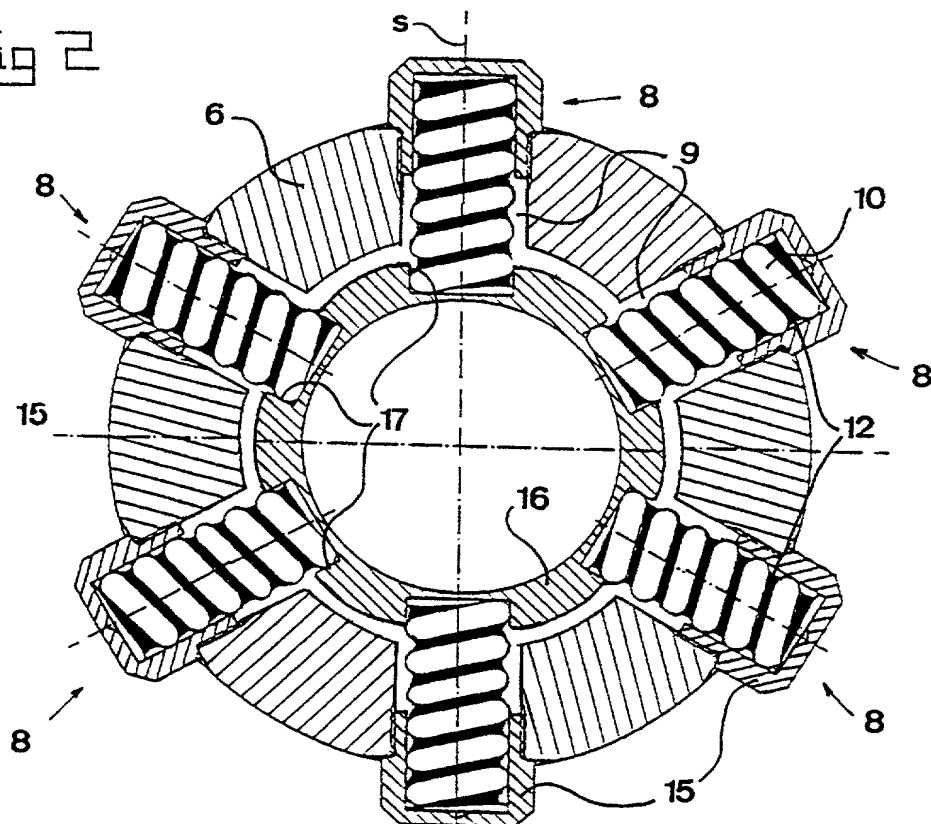
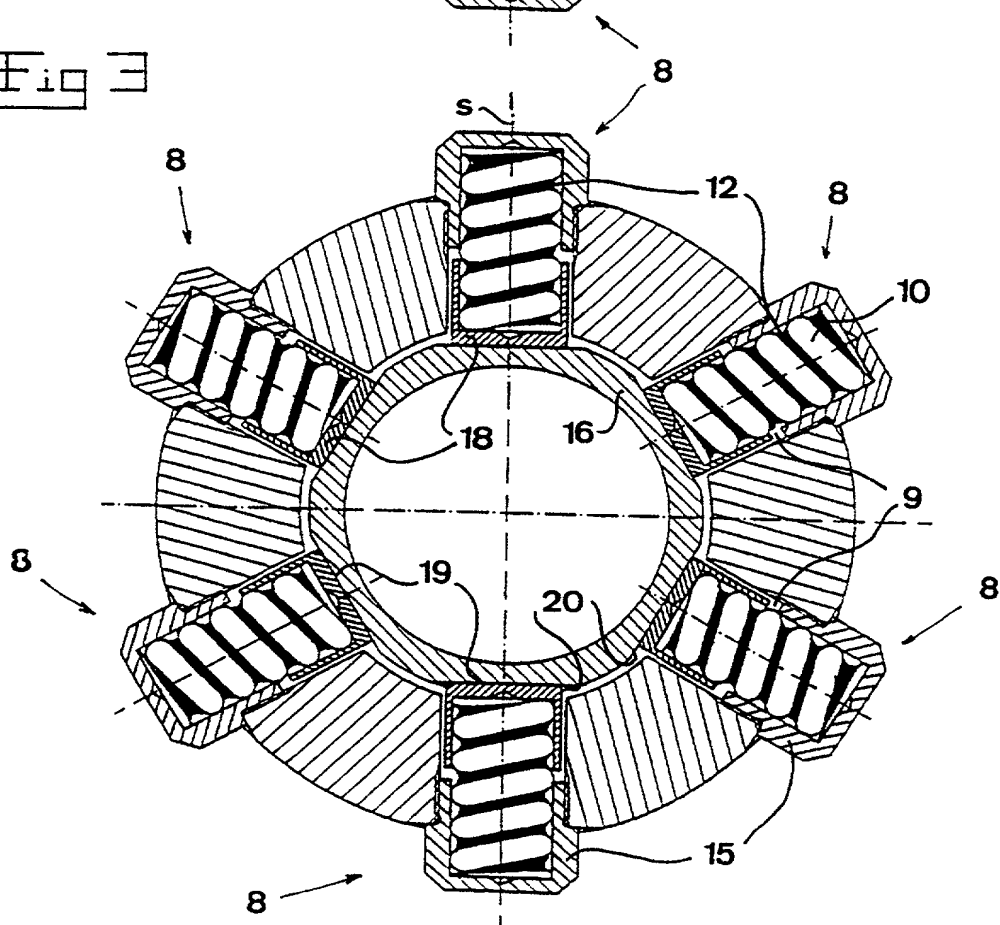


Fig 3



09/623714-47:26360

Fig 4

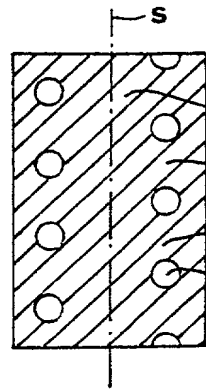


Fig 5

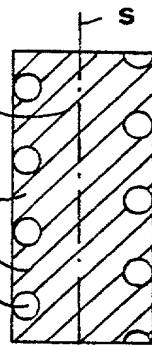


Fig 6

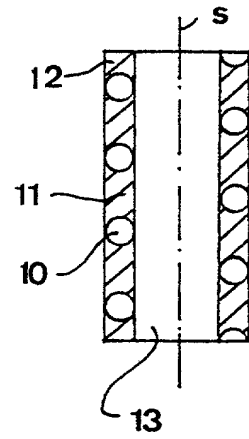


Fig 7

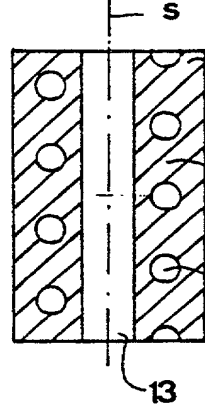


Fig 8

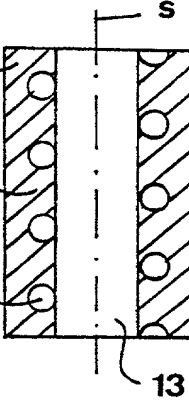


Fig 9

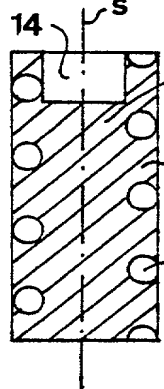
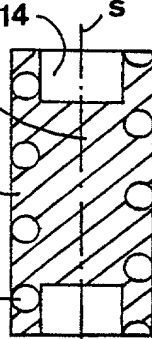


Fig 10



US 515 63/1450  
**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY**  
(includes Reference to PCT International Applications)

Attorney's docket No.

09546-01/001

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**A SUPPORT DEVICE**

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application.

Serial No. \_\_\_\_\_

on \_\_\_\_\_

and was amended

on \_\_\_\_\_ (if applicable).

☒ was filed as PCT international application

Number PCT/SE99/00395

on 12 March 1999

and was amended under PCT Article 19

on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

**PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:**

COUNTRY (if PCT indicate PCT)	APPLICATION NO.	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119
Sweden	9800832-9	13 March 1998	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

**Combined declaration for patent application and power of attorney (continued)**  
(includes Reference to PCT International Applications)

Attorney's docket No.

09542-1100

**PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:**

U.S. APPLICATIONS		STATUS (Check one)		
APPLICATION NO.	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
APPLICATION NO.	FILING DATE	US SERIAL NO. ASSIGNED (if any)		
SE99/00395	12 March 1999			

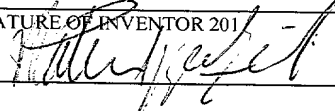
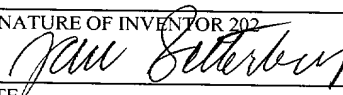
**POWER OF ATTORNEY:** I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: William J. Hone, Reg. No. 26,739; Richard P. Ferrara, Reg. No. 30,632; John B. Pegram, Reg. No. 25,198; Frederick H. Rabin, Reg. No. 24,488.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202
	
DATE	DATE
2000-08-07	2000-08-07